A STUDY OF INCIDENCE AND PATHOLOGICAL PATTERN OF CARCINOMA OESOPHAGUS AT GOVERNMENT RAJAJI HOSPITAL, MADURAI

DISSERTATION SUBMITTED FOR

M.S. DEGREE BRANCH I (GENERAL SURGERY)

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CONTENTS

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CERTIFICATE

This is to certify that the dissertation entitled **"A STUDY OF INCIDENCE AND PATHOLOGICAL PATTERN OF CARCINOMA OESOPHAGUS AT GOVERNMENT RAJAJI HOSPITAL, MADURAI"** submitted by **Dr.K.SELVAKUMAR** to the Faculty of General Surgery, The Tamil Nadu Dr.M.G.R. Medical university, Chennai in partial fulfillment of the requirement for the award of **M.S. Degree in General Surgery** is a bonafide work carried out by him during the period of Nov 2007 – Nov 2009 under my direct supervision and guidance.

Place : Madurai
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DECLARATION

I, Dr.K.SELVAKUMAR solemnly declare that the dissertation titled **"A STUDY OF INCIDENCE AND PATHOLOGICAL PATTERN OF CARCINOMA OESOPHAGUS AT GOVERNMENT RAJAJI HOSPITAL, MADURAI"** has been prepared by me.

This is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfillment of the requirement for the requirement for the award of **M.S. Degree in General Surgery** to be held in March 2010.

Place : Madurai

Date : **DR. K.SELVAKUMAR**

LEGEND

D	-	Dysphagia
W	-	Weight loss
O	-	Odynophagia
C	-	Cough and Hoarseness
R	-	Regurgitation
B	-	GI bleed
Pneu	-	Recurrent LRT1
M	-	Middle Third
U	-	Upper Third
L	-	Lower Third
SCC	-	Squamous Cell Carcinoma
RT	-	Radiotherapy
FG	-	Feeding Gastrostomy
THE	-	Transhiatal Esophagectomy
IL	-	Ivor Lewis Esophagectomy

INTRODUCTION

Carcinoma of the esophagus is one among the most challenging problems confronted by the oncologic surgeon. Esophageal tumors are highly likely to result in early mortality owing to the likelihood of advanced disease at the time of diagnosis and the challenging nature of their treatment. Survival rates have not improved significantly in 25 years despite the availability of new treatment modalities.

Squamous cell carcinomas are the most common malignancies of the esophagus worldwide. However adenocarcinomas of the esophagus and cardia are relatively common, particularly is the western hemisphere. The reported incidence of these cancers is increasing in the United States at a rate surpassing that of any other cancer.

This study was undertaken to analyse the incidence and pathological pattern of carcinoma of the esophagus at the Government Rajaji Hospital, Madurai and to compare that with international literature.

AIMS OF THE STUDY

The aims of this study were to analyze and study

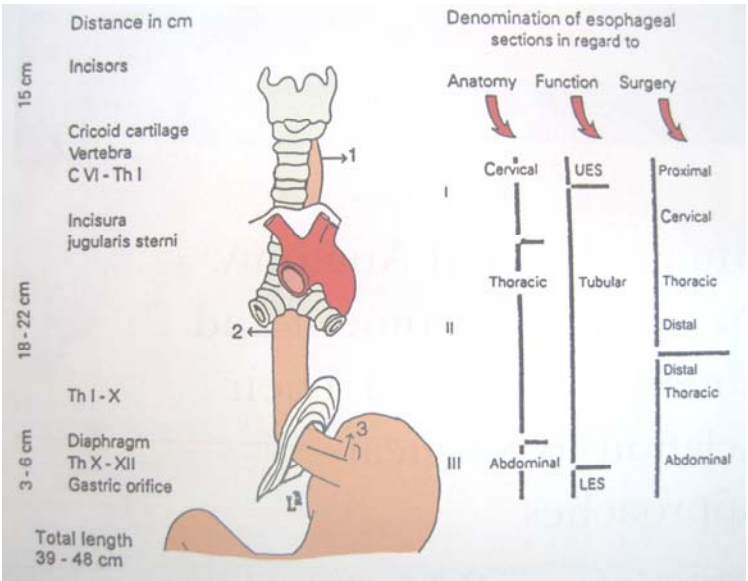
1. The incidence of carcinoma esophagus age and sex wise.
2. The clinical presentation of carcinoma esophagus.
3. The common sites of occurrence.
4. The pathological pattern of carcinoma esophagus at Government Rajaji Hospital, Madurai.

REVIEW OF LITERATURE

ANATOMY OF ESOPHAGUS

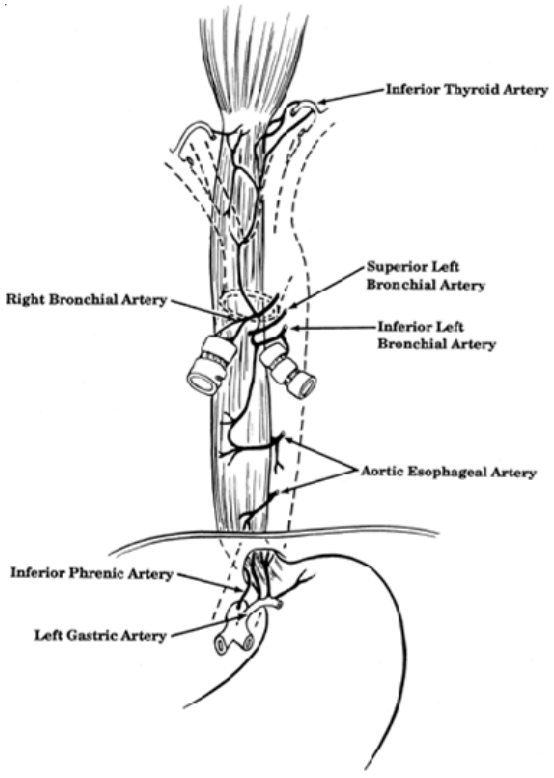
The esophagus commences at the cricopharyngeus muscle at the level of the cricoid cartilage and extends 5 to 6 cm in the cervical region to enter the thoracic inlet. The intrathoracic esophagus extends an additional 20 to 25 cm to the gastro esophageal junction.

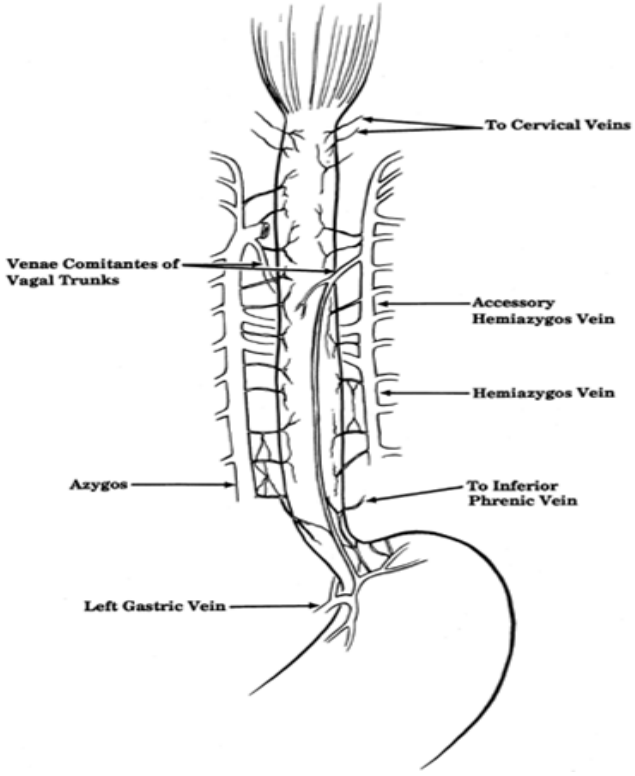
Typically, many radiologists and surgeons divide the esophagus into thirds whereby the upper third extends from the cricopharayngeus to the superior portion of the aortic arch, the middle third extends from the aortic arch to the inferior pulmonary veins, and the distal third extends from the level of the inferior pulmonary veins to the gastro esophageal junction.



BLOOD SUPPLY

The blood supply to the esophagus is segmental, with vessels extending into the esophagus to form a submucosal vascular plexus. The cervical esophagus is supplied primarily by the superior and inferior thyroid arteries, whereas the thoracic esophagus is supplied by esophageal arteries arising directly from the aorta near the level of carina; the distal esophagus and gastric cardia are supplied primarily by the left gastric artery. Venous drainage from the esophagus is into the azygous and hemiazygous veins as well as intercostals veins that ultimately drain into the azygous system.





LYMPHATICS

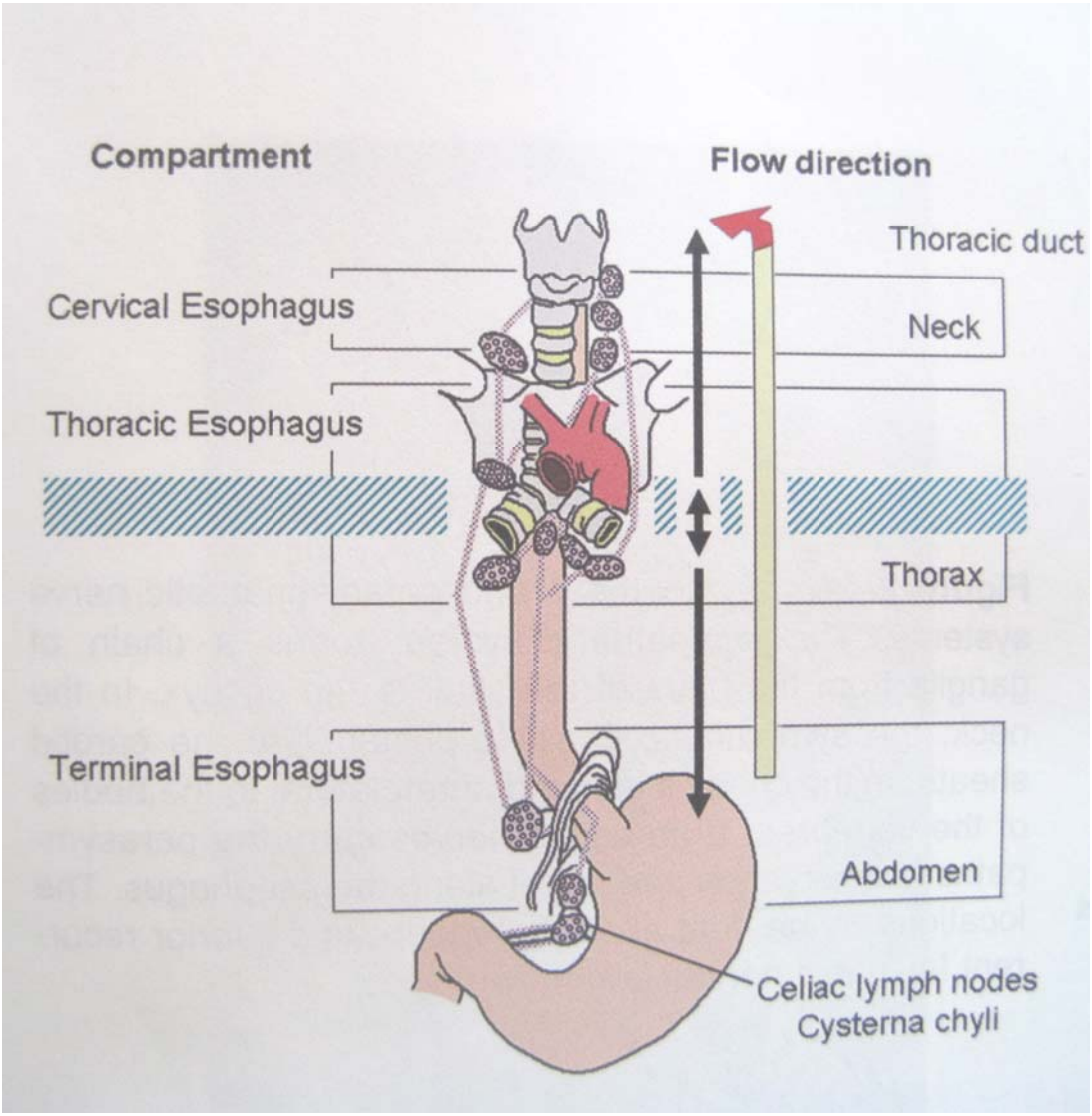
The esophagus contains abundant mucosal and submucosal lymphatic that communicate with lymphatic channels in the muscular layers to drain either directly through the esophageal wall to adjacent lymph nodes or to the thoracic duct.

Lesions in the upper third of the esophagus tend to drain initially to internal jugular, cervical, and supraclavicular nodes; in contrast, middle third lesions drain initially to paratracheal, hilar, subcarinal, paraesophageal, and pericardial nodal regions.

Distal third tumors tend to drain to nodes along the lesser curvature, left gastric artery, and celiac axis. However, because the pattern of lymphatic drainage is primarily longitudinal rather than segmental, extensive regional dissemination of cancer cells may occur irrespective of the location of the primary tumor.

Celiac nodal metastases have been observed in 10% of patients with upper third carcinomas, and nearly 45% of individuals with middle third

lesions; approximately 30% patients with middle or lower third carcinomas have metastatic disease in deep cervical lymph nodes at presentation.



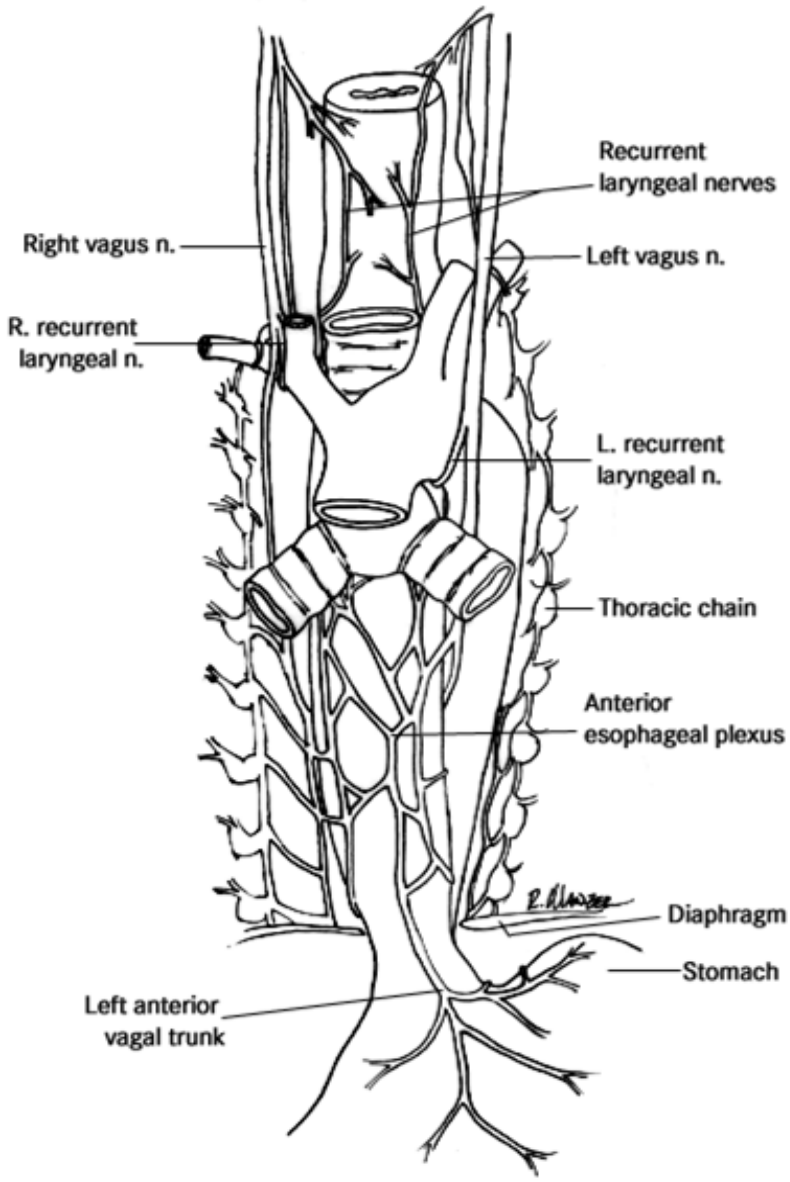
Nerve supply

Parasympathetic system

Vagal system motor and secretomotor

Sympathetic system:

Cervical and upper thoracic ganglion and greater splanchnic nerve.



CARCINOMA ESOPHAGUS

PREDISPOSING CONDITIONS

TYLOSIS

Tylosis (focal nonepidermolytic palmoplantar keratoderma) is a rare disease inherited in an autosomal dominant manner that is characterized by hyperkeratosis of the palms and soles and esophageal papillomas.

Patients with this condition exhibit abnormal maturation of squamous cells and inflammation within the esophagus and have extremely high risk of developing esophageal cancer. The tylosis esophageal cancer (TOC) gene has been mapped to 17q25 by linkage analysis of pedigrees associated with high risk of esophageal cancer development.

PLUMMER – VINSON / PATERSON – KELLY SYNDROME

Plummer-Vinson/Paterson-Kelly syndrome is characterized by iron-deficiency anemia, glossitis, kelosis, brittle fingernails, splenomegaly and esophageal webs. Approximately 10% of individuals with Plummer-Vinson/Paterson-Kelly syndrome develop hypopharyngeal or esophageal epidermoid carcinomas. The mechanisms by which these tumors arise have not been fully defined, although nutritional deficiencies as well as chronic mucosal irritation from retain food particles at the level of the webs may contribute to the pathogenesis of these neoplasms.

Caustic Injury

Squamous cell carcinomas may arise in lye strictures, often developing 40 to 50 years following caustic injury. The majority of these cancers are located in the middle third of the esophagus. The pathogenesis of these neoplasms may be similar to that implicated in esophageal cancers arising in patients with Plummer-Vinson syndrome.

These cancers are often diagnosed late due to the fact that chronic dysphagia and pain due to the lye strictures obscure symptoms of esophageal cancer.

Achalasia

Achalasia is an idiopathic esophageal motility disorder characterized by increased basal pressure in the lower esophageal sphincter, incomplete relaxation of this sphincter following deglutition, and aperistalsis of the body of the esophagus. A 16 to 30 fold increase in esophageal cancer risk has been noted in achalasia patients. These neoplasms typically are squamous cells carcinomas, believed to result from prolonged irritation from retained foods at the air-fluid interface in the midesophagus.

Human papillomavirus infection

Several studies suggest that human papillomavirus (HPV) may contribute to the pathogenesis of esophageal squamous cell cancers in high incidence areas in Asia and South Africa.

Prior Aerodigestive Tract Malignancy

Carcinomas of the aerodigestive tract arise as the consequence of multistep processes in cancerization fields. Patients with upper aerodigestive tract cancers develop second primary cancers at a rare of approximately 4% per year. Nearly 10% of secondary neoplasms arising in patients with prior histories of oropharyngeal carcinoma arise in the esophagus.

Barrett's Esophagus

Barrett's esophagus is characterized by the presence of columnar epithelium lining 3 or more cm of the distal tubular esophagus in the presence or absence of hiatal hernia. Barrett's esophagus has been associated with a 30 to 40 fold increase in the risk of adenocarcinoma, the incidence of which increased at a rate of 10% per year during the 1980s.

MOLECULAR BIOLOGY

Flow cytometric and molecular analyses of dysplastic squamous and Barrett's epithelia have revealed that esophageal cancers arise via widespread clonal outgrowth of cells exhibiting aberrant cell-cycle regulation. In general, genomic instability precedes the appearance of histologic abnormalities in esophageal mucosa, and the extent of cell-cycle derangements influences progression to malignancy in this setting.

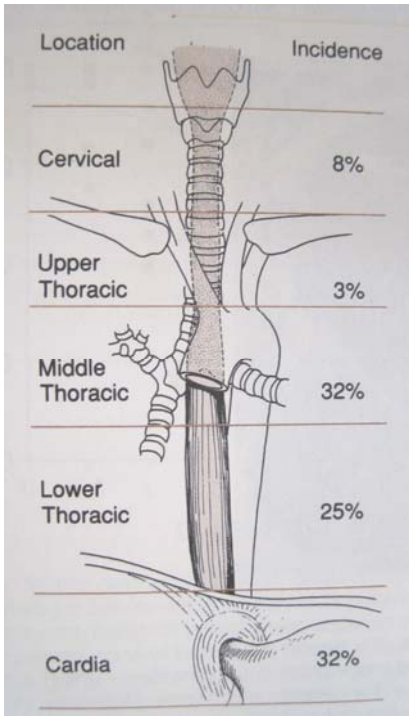
Many of the oncogene and tumor suppressor gene mutations frequently observed in esophageal cancers and their precursor lesions perturb cell-cycle regulation by disrupting the G (1) restriction point.

PATHOLOGY

The overwhelming majority of esophageal malignancies may be classified as either squamous cell carcinomas or adenocarcinomas. Squamous cell carcinomas account for the vast majority of cancers arising in high-incidence areas throughout the world. Approximately 60% of these neoplasms are located in the middle third of the esophagus, whereas 30% and 10% arise in the distal third or proximal third of the intrathoracic esophagus, respectively. Typically, these tumors are moderately well differentiated and often are associated with contiguous or noncontiguous carcinoma in situ, as well as widespread submucosal lymphatic dissemination.

Adenocarcinomas frequently arise in the context of Barrett's esophagus; as such, these tumors tend to be localized in the distal third of the esophagus and may be fungating or stenotic in appearance. Many of these tumors are well differentiated adenocarcinomas, and the vast majority are associated with intraepithelial neoplasia. No significant survival differences have been noted in adenocarcinoma patients compared with similarly staged individuals with squamous cell cancers.

Several rare cancers of the esophagus have been described, including squamous cell carcinoma with sarcomatous features, as well as adenoid cystic, and mucoepidermoid carcinomas. These neoplasms are indistinguishable clinically and prognostically from the common types of esophageal carcinomas.



CLINICAL PRESENTATION

Because it lacks a serosal coat, the esophagus is able to distend and accommodate considerable intraluminal tumor growth before deglutition is affected; as such, 50% of esophageal cancer patients have locally advanced unresectable disease or distant metastases at presentation.

Dysphagia and weight loss are the initial symptoms in approximately 90% of patients presenting with esophageal cancer. Approximately 75% of the esophageal circumference must be involved with tumor before dysphagia is experienced; hence, although many patients relate a vague discomfort with swallowing for several months, dysphagia to solid foods may progress rapidly to total obstruction from circumferential tumor growth. Approximately 20% of patients experience odynophagia (painful swallowing). Although the vast majority of esophageal cancer patients present with weight loss, cachexia is seen in less than 10% of these individuals. Additional presenting symptoms may include dull retrosternal pain resulting from invasion of mediastinal structures, cough, or hoarseness due to paratracheal nodal or recurrent laryngeal nerve involvement. Infrequently, patients may present with pneumonia secondary to tracheoesophageal fistula or exsanguinating hemorrhage due to erosion of the esophageal neoplasm into the aorta.

DIAGNOSIS

Esophageal cancer should be suspected in any patient complaining of dysphagia and weight loss. A thorough history should be ascertained, focusing on preexisting conditions, as well as tobacco and ethanol abuse, which are known to be associated with increased esophageal cancer risk.

Aspiration cytology should be performed on palpable cervical lymph nodes to rule out extrathoracic metastases.

RADIOGRAPHY

Chest radiography and barium swallow should be performed; the barium swallow provides an inexpensive and important initial assessment of the extent of the disease within the esophagus and should include the entire esophagus as well as stomach and duodenum; double-contrast studies are preferable because they provide more precise evaluation of mucosal patterns and allow detection of small lesions that may be missed on single-contrast examination.

ENDOSCOPY

Patients who are suspected to have a primary esophageal carcinoma on the basis of history, physical examination, or radiographic studies should undergo esophagoscopy to establish tissue diagnosis and define the extent of

the esophageal lesion. At the time of endoscopy, attention should focus on the identification of the neoplasm in relation to cricopharyngeus, the squamocolumnar junction, and the diaphragmatic hiatus; in addition the presence or absence of satellite lesions, Barrett's esophagus, and esophagitis should be noted. Biopsies and brushings should be obtained from suspicious lesions; the combined diagnostic accuracy of these two procedures exceeds 90%.

Vital stains including toluidine blue or lugol's iodine may be useful to guide endoscopic biopsies in situations in which lesions are equivocal. Frequently, strictures are encountered that require dilation to allow passage of the endoscope and provide temporary relief of dysphagia. Occasionally, the esophagus is so structured it cannot be safely dilated; in these situations multiple biopsies in four quadrants should be obtained, and the patients treated as if they have esophageal carcinoma irrespective of biopsy results. Bronchoscopy should always be performed inpatients with potentially resectable upper and middle third esophageal carcinomas to rule out recurrent laryngeal nerve involvement and to identify and biopsy suspicious areas within the membranous trachea to rule out impending esophagotracheal fistula.

CT

Once a tissue diagnosis of esophageal cancer has been established, additional studies should be obtained to accurately stage the disease according to American Joint committee on cancer criteria in order to ascertain prognosis and optimize treatment. Tumor length and the degree of obstruction appear to have less effect than the extent of wall penetration and lymph node metastases in determining survival of esophageal cancer patients.

Computed tomography (CT) of the test chest and upper abdomen should be obtained to evaluate the extent of disease within the chest and rule out visceral metastases in the abdomen Current noninvasive imaging modalities are imperfect regarding evaluation of local regional disease and detection of distant metastases in these individuals. Conventional CT scans detect the primary tumor in 75% to 80% of cases; however, sensitivity for local regional nodal disease is only 50% to 70%.

Furthermore, although CT scans may accurately predict respectability in as many as 75% of cases, they have not proven useful for assessing response to induction therapy in esophageal cancer patients.

Endoscopic ultrasound:

Endoscopic ultrasonography (EUS) has been advocated as a means to enhance the accuracy of staging of esophageal cancers. Several studies indicate that in experienced hands, EUS accurately assesses wall involvement in 50% to 90% of tumors and mediastinal lymph node status in 67% to 100% of patients with localized esophageal cancers. EUS may be a valuable noninvasive means to detect celiac nodal metastases in esophageal cancer patients sensitivity - 70% to 80% and specificity - 88% to 98%). However, the accuracy of EUS is highly dependent on the expertise of the unltrasonographer; an incomplete or erroneous assessment of lymph node metastases, invasion of adjacent organs, and poor staging of early carcinoma have been reported. Furthermore, EUS has limited value in staging patients with high – grade obstruction or assessing response to induction therapy in esophageal cancer patients.

PET scans:

[**18F] Fluorodeoxyglucose (FDG) positron emission tomography (PET) scans have been used for staging patients with locally advanced esophageal cancers. PET scans may enhance the sensitivity for imaging small metastatic deposits in the medastinum and abdomen. Further refinement may enable the diagnostic accuracy of PET scans to equal that acheieved by minimally invasive staging technique.

Furthermore, preliminary data suggest that PET scans may prove to be valuable for assessing response to induction therapy in esophageal cancer patients in contrast to CT scans or EUS, which appear to be unreliable for evaluation of treatment response in these individuals. Use of these imaging modalities may enhance the accuracy of staging in esophageal cancer patients, thereby improving stratification of individuals for multimodality treatment protocols.

STAGING

The modern staging of carcinoma of the esophagus is based on the tumor/node/metastasis (TNM) classification developed by the American Joint Committee on cancer.

Clearly, patient outcomes depend on the initial stage of the cancer at diagnosis. Although surgical pathology yields the most accurate staging, the advent of better imaging techniques, including endoscopic ultasonography, has improved preclinical staging; (18)F-flurodeoxyglucose positron emission tomography (FDG-PET) may be useful for detection of distant lymphatic and hematogenous metastases.

At diagnosis, nearly 50% of patients have cancer that extends beyond the locoregional confines of the primary. Fewer than 60% of patients with locoregional cancer can undergo a curative resection. Nearly 70% to 80% of resected specimens harbor metastases in the regional lymph nodes. Thus, clinicians are often dealing with advanced-stage carcinoma in newly diagnosed patients.

(American Joint Committee on Cancer (AJCC) TNM Classification of Carcinoma of the Esophagus*)

Primary tumor (T)

TX Primary tumor cannot be assessed

T0 No evidence of primary tumor

Tis Carcinoma in situ

T1 Tumor invades lamina propria or submucosa

T2 Tumor invades muscularis propria

T3 Tumor invades adventitia

T4 Tumor invades adjacent structures

Regional lymph nodes (N)

NX Regional lymph nodes cannot be assessed

N0 No regional lymph node metastasis

N1 Regional lymph node metastasis

Distant metastasis (M)

MX Distant metastasis cannot be assessed

M0 No distant metastasis

M1 Distant metastasis

Tumors of the lower thoracic esophagus

M1a metastasis in celiac lymph nodes

M1b other distant metastasis

Tumors of the midthoracic esophagus

M1a Not applicable

M1b nonregional lymph nodes and/or other distant

Metastasis

Tumors of the upper thoracic esophagus

M1a Metastasis in cervical nodes

M1b other distant metastasis

Stage Grouping

Stage 0	Tis N0 M0
Stage I	T1 N0 M0
Stage II A	T2 N0 M0
	T3 N0 M0
Stage II B	T1 N1 M0
	T2 N1 M0
Stage III	T3 N1 M0
	T4 Any N M0
Stage IV	Any T Any N1 M1
Stage IV A	Any T Any N M1 a
Stage IV B	Any T Any N M1 b

Histologic Grade (G)

Gx	Grade cannot be assessed
G1	Well differentiated
G2	Moderately differentiated
G3	Poorly differentiated
G4	Undifferentiated

TREATMENT

The treatment of choice for patients with esophageal cancer is controversial. Esophagectomy remains the standard of care; however, its role has been challenged due to the generally poor outcomes following surgical resection alone in patients who typically have locally advanced disease. A survey of community care practice patterns between 1988 and 1993 revealed an increase in the use of chemoradiotherapy relative to surgery as primary management of esophageal cancer.

Currently, in many institutions, primary resection is deferred in favour of combined modality therapy with or without adjuvant esophagectomy. The routine use of combined modality treatment outside the realms of controlled clinical trials is troublesome since most randomized trials have not shown a survival advantage of various induction regimens compared with esophagectomy alone. Furthermore, there is considerable controversy within the surgical literature as to what represents the appropriate operation for patients with esophageal cancer; the debate focuses primarily on the need for and the extent of lymph node dissection during esophagectomy for cancer. The following discussion

summarizes the current status of surgery, chemotherapy, radiation therapy and combined modality regimens in the treatment of esophageal cancer.

Primary therapy of esophageal cancer is either surgical or nonsurgical. Although the overall results of these approaches are similar, the patient populations selected for treatment with each modality are usually different, resulting in a potential selection bias against non surgical therapy. Patients with poor prognostic features, including those with comorbid conditions, or unresectable or metastatic disease, are more commonly selected for treatment with nonsurgical therapy.

SURGICAL RESECTION

Surgical Approaches

Various surgical approaches may be used, depending on the size and location of the primary tumor and on the preferences of the surgeon. The optimal location of the anastomosis has been debated. The advantages of the cervical anastomosis include more extensive resection of the esophagus, possibility of avoiding thoracotomy, less-severe symptoms of reflux, and less severe complications related to anastomotic

leak. Advantages of the thoracic anastomosis include a lower incidence of anastomotic leak and lower stricture rate.

Although some surgeons prefer the colon interposition, most surgeons use the stomach as the conduit to replace the esophagus after esophagogastrectomy. Colon interposition is usually reserved for patients who have had previous gastric surgery or other procedures that have devascularized the stomach. The use of the gastric conduit simplifies the procedure and is associated with equivalent patient satisfaction and fewer postoperative complications.

Several approaches are acceptable for esophagogastrectomy. **Ivor-Lewis esophagogastrectomy** uses abdominal and right thoracic incisions, with upper thoracic esophagogastric anastomosis (at or above the azygos vein). Mobilization of the stomach for use as the conduit is performed, with dissection of the celiac and left gastric lymph nodes, division of the left gastric artery, and preservation of the gastroepiploic and right gastric arteries. This approach may be used for lesions at any thoracic location, but margins may be inadequate for tumors in the middle esophagus.

Transhiatal esophagogastrectomy is performed using abdominal and left cervical incisions. The mobilization of the stomach for use as the conduit is performed as in the Ivor-Lewis esophagogastrectomy. This procedure is completed via the abdominal incision, and the gastric conduit is drawn through the mediastinum and exteriorized in the cervical incision for the esophagogstric anastomosis. This approach may be used for lesions at any thoracic location; however, transhiatal dissection of large, middle esophageal tumors adjacent to the trachea is difficult and may be hazardous.

Left thoracoabdominal esophagogastrectomy uses a contiguous abdominal and left thoracic incision, through the eighth intercostal space. Mobilization of the stomach for use as the conduit is performed as described previously, and esophagectomy is accomplished via the left thoracotomy. Esophagogastric anastomosis is performed in the left chest, usually just superior to the inferior pulmonary vein, although it may be performed higher if the conduit is tunneled under the aortic arch. This approach may be used for lesions in the distal esophagus.

Minimally invasive esophagectomy might decrease morbidity; however, only a few series have been published. Open surgery should

remain the standard until studies show the advantages of minimally invasive approaches.

Transhiatal Esopagectomy

Transhiatal esophagectomy entails extirpation of the intrathoracic esophagus through the esophageal hiatus of the diaphragm without the need for a thoracotomy incision. An upper abdominal incision and a low-neck incision are required to isolate the esophagus at either end. The organ is next carefully stripped from its mediastinal attachments and removed. The prepared esophageal substitute, usually a greater curvature gastric tube, is advanced across the esophageal bed in the posterior mediastinum, and gastrointestinal continuity is restored by an end-to-side esophagogastrostomy in the neck. No attempt is made to perform a systematic lymph node dissection apart from the few parahiatal nodes removed with the specimen. Occasionally, sampling of readily accessible celiac and periesophageal nodes is performed.

Standard Transthoracic Esophagectomy

Transthoracic esophagectomy is probably the most widely performed operation for cancer of the esophagus worldwide. The procedure carried out through a right or Left thoracotomy incision depending on the preference of the surgeon and the location of the tumor within the esophagus. Generally, a right thoracotomy is required for adequate exposure of tumors in the middle or upper third that are anatomically intimately related to the membranous trachea or the arch of the aorta.

Tumors located at the gastroesophageal junction or in the lower third of the esophagus can be usually approached through a left thoracotomy incision. A left sixth interspace incision provides excellent exposure of the lower mediastinum, and a semicircular diaphragmatic incision performed 1 inch from the costal arch allows access to the upper abdomen. The esophagus is mobilized from its mediastinal bed alongwith adjoining periesophageal as well as lesser curvature lymph nodes; no radical mediastinal or upper abdominal lymphadenectomy is performed. Gastrointestinal reconstruction is subsequently achieved by preparation of

the esophageal substitute (usually stomach) and advancing it to the neck for a cervical anastomosis. Patients operated on through a right thoracotomy require a laparotomy to prepare the gastric tube and pass it across the posterior mediastinum or retrosternal space for a cervical anastomosis. In patients operated on through a left thoracotomy, the esophagus is mobilized along its course in the supra aortic posterior mediastinum well into the neck. The prepared gastric tube is then passed underneath the aortic arch and attached to the esophageal stump. Following reattachment of the diaphragm and closure of the thoracotomy, a small left cervical incision is performed to retrieve the esophagus and the gastric tube. A cervical incision is then performed and the previously mobilized esophagus and gastric tube are easily delivered to the neck for a cervical anastomosis.

Comparison of Transhiatal and Transthoracic Esophagectomy

Several retrospective studies have shown little difference in the operative mortality and morbidity between transhiatal and transthoracic esophagectomy with limited lymph node dissection.

En Bloc Esophagectomy

The deep location of the esophagus within the narrow space confines of the mediastinum and the lack of a well-defined mesentery have generally precluded the application of en bloc resection to patients with esophageal carcinoma. The basic principle of operation is extirpation of the tumor-bearing esophagus within a wide envelope of adjoining tissues that include both pleural surfaces laterally and the pericardium anteriorly where these structures are intimately related to the esophagus. The lymphatics wedged dorsally between the esophagus and the aorta, and the thoracic duct throughout its mediastinal course, are resected en bloc with the specimen. This posterior mediastinectomy necessarily results in a complete medistinal node dissection from the tracheal bifurcation to the esophageal hiatus. Additionally, an upper abdominal lymphadenectomy is performed including the common hepatic, celiac, left gastric, lesser curvature, parahiatal, and retroperitoneal nodes. The purpose of this extended resection is to maximize locoregional control of the primary tumor. Critics have argued that the en bloc procedure is associated with a high operative mortality and morbidity without an apparent survival advantage.

Three-Field Lymphadenectomy

Three-field lymph node dissection for carcinoma of the esophagus has been practiced by Japanese surgeons since the early 1980s. This effort was initially promoted by studies showing that the cervical lymph nodes were the site of tumor recurrence in 30% to 40% of patients in whom a curative resection had been performed. The extended procedure included dissection of the cervical, mediastinal, and upper abdominal nodes in patients with carcinoma of the thoracic and abdominal esophagus.

RADIATION THERAPY

It may be used either a external beam irradiation or as intraluminal brachytherapy. External beam therapy may be used with a curative intent, in the adjuvant, neoadjuvant settings and with concurrent chemotherapy as chemoradiation. External beam radiation may also be used as a palliative measure in advanced tumors.

RT alone should generally be reserved for palliation for patients who are medically unable to receive chemotherapy. Alternative radiation approaches, such as hypoxic cell sensitizers and hyperfractionation, have not resulted in a clear survival advantage. Experience with intraoperative radiation as an alternative to external-beam radiation is limited. Conformal and intensity modulated RT are currently being investigated. In the adjuvant setting, randomized trials do not show a survival advantage for preoperative or postoperative RT alone versus surgery along for esophageal cancer. This metaanalysis found that neoadjuvant chemoradiation and surgery improved 3-year survival and reduced local-regional cancer recurrence when compared with surgery alone. Such analyses only suggest that preoperative approaches need continued investigations.

Brachytherapy

Intraluminal brachytherapy allows the escalation of the dose to the primary tumor while protecting the surrounding dose-limiting structures such as the lung, heart, and spinal cord. A radioactive source is placed intraluminally via endoscope or a nasogastric tube.

Brachytherapy has been used both as primary therapy (usually as a palliative modality), as well as boost following external-beam radiation therapy or combined modality therapy. It can be delivered by high dose-rate or low dose-rate. As a single therapy, brachytherapy is used as a palliative modality and results in a local control rate of 25% to 35% and a median survival of approximately 5 months.

ENDOLUMINAL PALLIATION TECHNIQUES

As previously discussed, surgery remains the standard of care for patients with respectable neoplasms; however, many esophageal cancer patients are inoperable due to locally advanced or distant metastatic disease. Although chemotherapy and radiation therapy are typically used

to palliate unresectable disease, many individuals require additional measures to relieve dysphagia and pain.

Esophageal dilation frequently can alleviate esophageal obstruction secondary to malignancy; however, results usually are temporary, and patients require repeated treatments. Safe and effective palliation can be achieved by endoluminal stents, laser, or photodynamic therapy (PDT) techniques.

CHEMOTHERAPY

A variety of single agents and combination regimens have been evaluated in patients with recurrent or metastatic carcinoma of the esophagus. These patients often have a high tumor burden and poor performance status with little prospect for prolongation of survival. Bleomycin, 5-fluorouracil (5-FU), mitomycin, and cisplatin (CDDP) have been used most often because of their single agent activities and their additive or synergistic effects with radiation.

Chemotherapy can provide transient palliation for some patients with advanced locoregional carcinoma, but other approaches (including combined modality therapy) are more effective for this purpose.

The list of established chemotherapeutic drugs active against esophageal carcinoma is small. In the past 25 years, only 16 cytotoxic drugs were investigated systematically against metastatic esophageal carcinoma. The activity of nearly all these agents was established against squamous cell histology. Cisplatin has been considered one of the most active agents, with a single-agent response rate consistently in the range of 20% or greater. Older agents considered to be active include 5-FU, mitomycin, cisplatin, beomycin, methotrexate, mitoguazone, doxorubicin and vindesine. Newer agents that have shown activity include paclitaxel, docetaxel, vinorelbine, oxaliplatin with 5-FU, lobaplatin, irinotecan, nedaplatin, and gefitinib.

Combination chemotherapy

Only in more recent years have combination regimens been evaluated in patients with adenocarcinoma. The two-drug combination of cisplatin (100 mg/m^2 day 1) and 5-FU (1000 mg/m^2/d continuous infusion for 96 to 120 hours) is the regimen most commonly used to treat patients with either squamous or adenocarcinoma histology.

Combination chemotherapy for metastatic carcinoma of the esophagus continues to evolve. Compared with adenocarcinoma,

squamous cell carcinoma appears to be more sensitive to chemotherapy, chemoradiation, or radiotherapy; however, the long term outcome is not different for patients with the two histologic types. The combination of 5-FU plus cisplatin is considered an acceptable therapy. It is the most investigated and most commonly used regimen for patients with carcinoma of the esophagus. Reported response rates to this combination vary between 20% and 50%. Paclitaxel combined with 5-FU and cisplatin has demonstrated activity in patients with squamous cell carcinoma and adenocarcinoma. In addition, the combination of irinotecan (CPT-11) and cisplatin appears to have activity, particularly against squamous cell carcinoma of the esophagus.

Although combination chemotherapy often results in higher response rate, it can be associated with higher morbidity.

TREATMENT RECOMMENDATIONS AND FUTURE DIRECTIONS

Although individuals occasionally are diagnosed early due to participation in screening protocols, the vast majority of patients with esophageal cancer present with either locally advanced (stages IIB or III) or inoperable metastatic disease. Esophagectomy remains the standard of care for patients who can tolerate resection. Available data from well-designed prospective randomized trials do not support the routine use of induction chemotherapy in resectable patients.

Further more, there are no convincing data that justify the routine use of chemotherapy following esophagectomy. Radiation therapy has no proven benefit as the sole modality in the induction setting, and current data indicate a potential benefit of this treatment modality in patients with positive resection margins, but not in completely resected individuals irrespective of nodal status. Limited data suggest that combined chemoradiation therapy may be beneficial in the induction setting in resectable patients, particularly in individuals achieving pathologic complete responses; surgery remains an important component of these aggressive protocols since no other modality enables accurate assessment of response to induction therapy, and no other intervention can enhance local control in this setting.

Patients with unresectable cancers should be palliated with chemoradiation therapy.

BEST SUPPORTIVE CARE

Medically unfit patients or those who develop an unresectable disease may be offered brachytherapy, laser therapy, PDT, or any other components of best supportive care including esophageal dilatation, pain control, enteral feeding and/or therapy to control bleeding.

For patients with metastatic carcinoma, only palliative care is appropriate. Whether to offer best supportive care alone or together with chemotherapy should be based on the patient's performance status. Patients with better performance status may be offered best supportive care alone or with chemotherapy.

The constituents of best supportive care depend on the patient's symptoms. In the case of esophageal obstruction, the patient may be offered a stent placement, laser surgery, PDT, radiotherapy, or a combination of these methods, as appropriate. Esophageal dilatation may also be useful. For patients requiring nutritional support, enteral feeding may be warranted. Pain control may be achieved with the use of radiotherapy plus pain medications. Similarly,

surgery or radiotherapy and / or endoscopic therapy may be indicated in patients with brisk bleeding from the carcinoma.

Salvage Therapy

Salvage therapy can range from aggressive intervention with curative intent inpatients with locoreginal relapse to therapy intended strictly for palliation in patients for whom cure is not a possibility. For patients with local relapse who have not received RT or chemotherapy, RT plus concurrent chemotherapy (5-FU/cisplatin) is preferred; other options include endoscopic therapies or surgery. For example, re-resection can be considered in selected patients with anastomotic recurrences. For patients with anastomotic recurrences. For patients who develop a resectable locoregional relapse after chemoradiotherapy but have not had surgery, the clinician should determine whether the patient is medically fit for surgery and if the relapse is technically resectable. If both of these criteria are met, surgery remain an option. If the patient has another relapse after surgery, the carcinoma should be considered incurable and the patient should receive palliative therapy. Medically unfit patients or those who develop an unresectable relapse after chemoradiotherapy may be offered brachy therapy, laser therapy, PDT, or any other components of best supportive care including esophageal dilatation, pain control, enteral feeding, and / or therapy to control bleeding.

For patients with metastatic carcinoma, only palliative care is appropriate. Whether to offer best supportive care alone or together with chemotherapy should be based on the patient's performance status. Patients with a karnofsky performance score of 60 or less should be offered only best supportive care. Patients with better performance status may be offered best supportive care alone or with chemotherapy.

Follow-up

All patients should be followed systematically. For asymptomatic patients, follow-up should include a complete history and physical examination every 4 months for 1 year, then every 6 months for 2 years, and annually thereafter. A complete blood count, multichannel serum bio-chemical evaluation, and a chest radiograph should be obtained as clinically indicated. Endoscopy and other radiologic studies should also be considered as clinically indicated (eg. Persistent or recurrent dysphagia). In addition, some patients may require dilatation of an anastomotic or a chemoradiation – induced stricture.

OUTCOMES

One of the major developments in the surgical therapy of Carcinoma esophagus has been the marked improvement in surgical morbidity and mortality as a result of improvement in surgical morbidity and mortality as a result of improvement in surgical techniques, patient selection and supply systems.

Surgical management of patients with Carcinoma esophagus may include staging, resection with curative intent and palliative techniques. The intent of surgery should be to achieve R0 resection. Palliative surgery should be avoided in patients with clearly unresectable or advanced cancer who can be effectively palliated with non surgical modalities.

The 5 year survival after R0 resection is 15-20% and the median survival after R0 resection is approximately 18 months. No difference in survival was observed between groups treated with surgery alone or induction therapy followed by surgery.

Long term outcomes depend on the initial stage of the carcinoma at presentation. Stage I, II and III cancer are considered potentially resectable. Aggressive preoperative staging (including esophageal ultra sound, PET and molecular biologic techniques) may result in improved prognostic stratification, improved patient selection for surgical therapy and improved over all survival.

Selecting patients for surgery includes assessing whether they are medially fit and the extent of their cancer. Patients with advanced comorbidity including severe cardiac and pulmonary disease, are not considered for resection but may benefit from non invasive palliative intervention. However most patients with early stage cancer will tolerate resection.

MATERIALS AND METHODS

This study consists of 76 cases of Ca esophagus who were admitted at Government Rajaji Hospital between November 2007 and November 2009. These patients were examined in detail as per the profoma prepared for this study. The patients were investigated to confirm the pathological diagnosis and to assess the extent and stage of the disease.

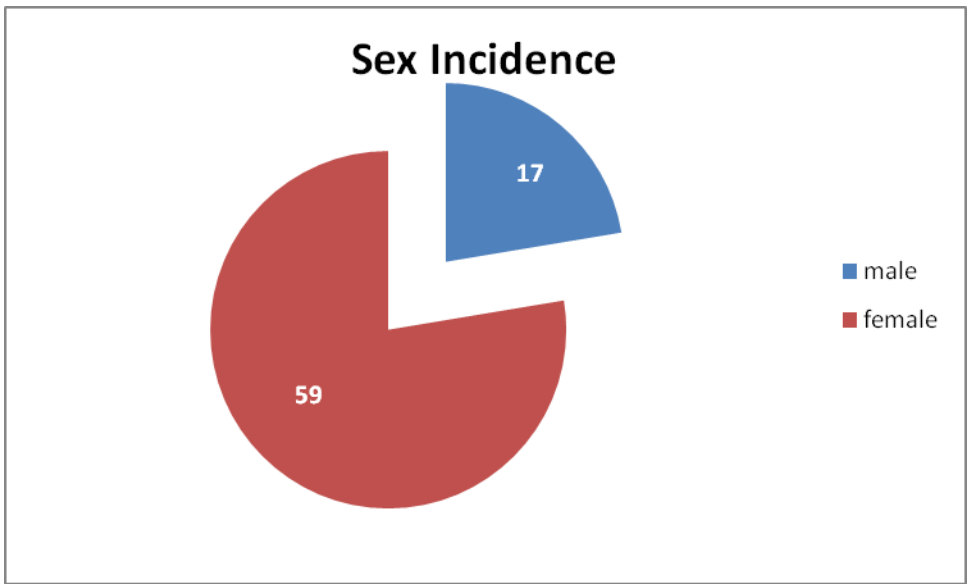
Lower mid third and lower third growths were submitted for surgery after respectability was assessed by CT scanning. Of the 24 patients thus submitted for surgery only 10 had resectable growths. 8 patients underwent Transhiatal esophagectomy and 2 underwent lvor Lewis esophagectomy.

Post – operatively they were followed up closely until discharge and then at weekly intervals for 8 weeks.

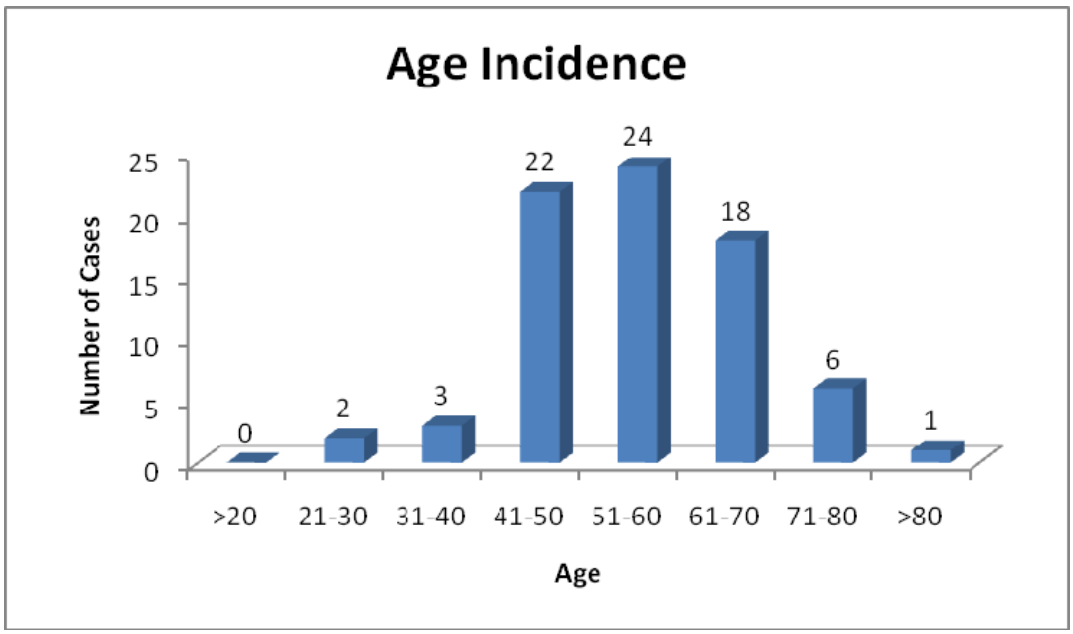
Other patients who had unresectable disease were given external Beam Radiotherapy with or without feeding gastrostomy / Jejunostomy. Patients with metastatic disease and those with poor performance status were just given supportive care.

RESULTS OF THE STUDY

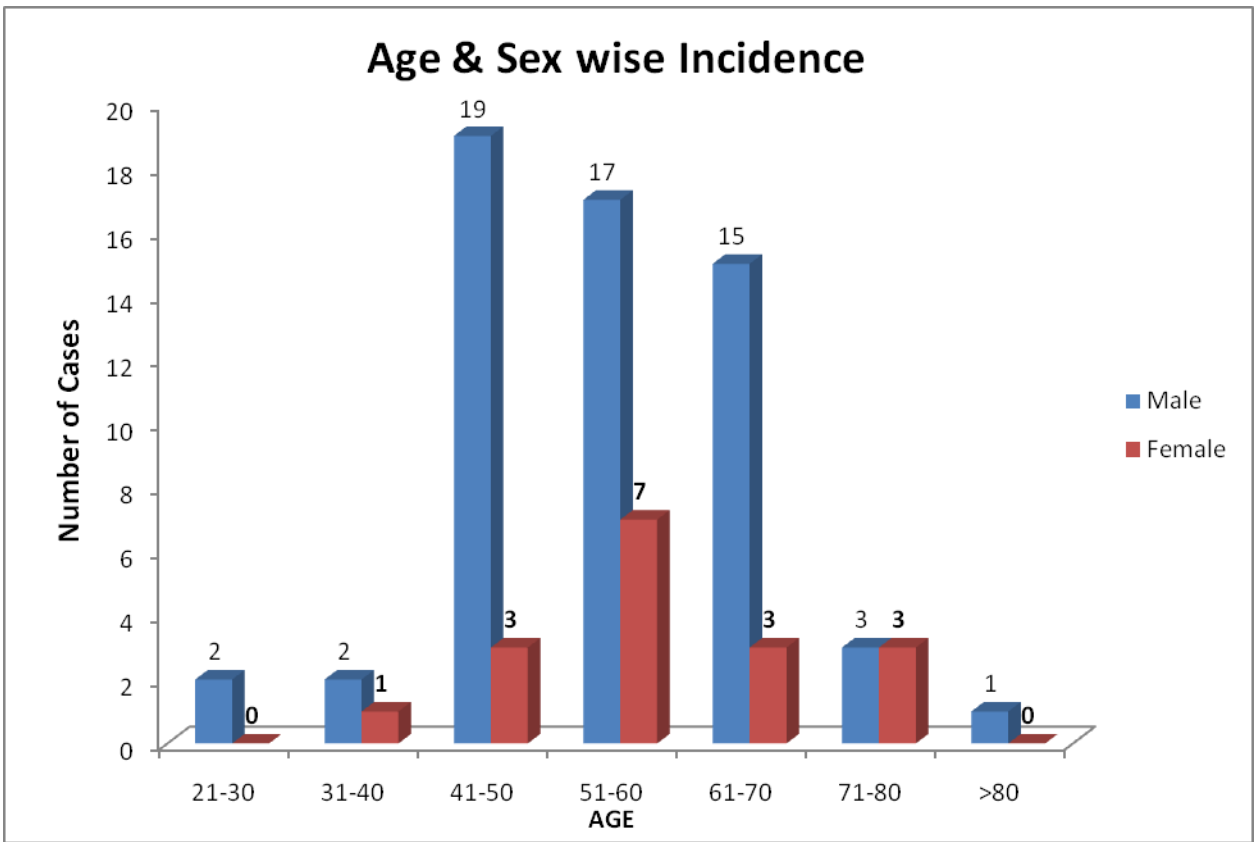
Incidence of Ca esophagus was more common in males with a **M:F incidence ratio of 3.5:1**



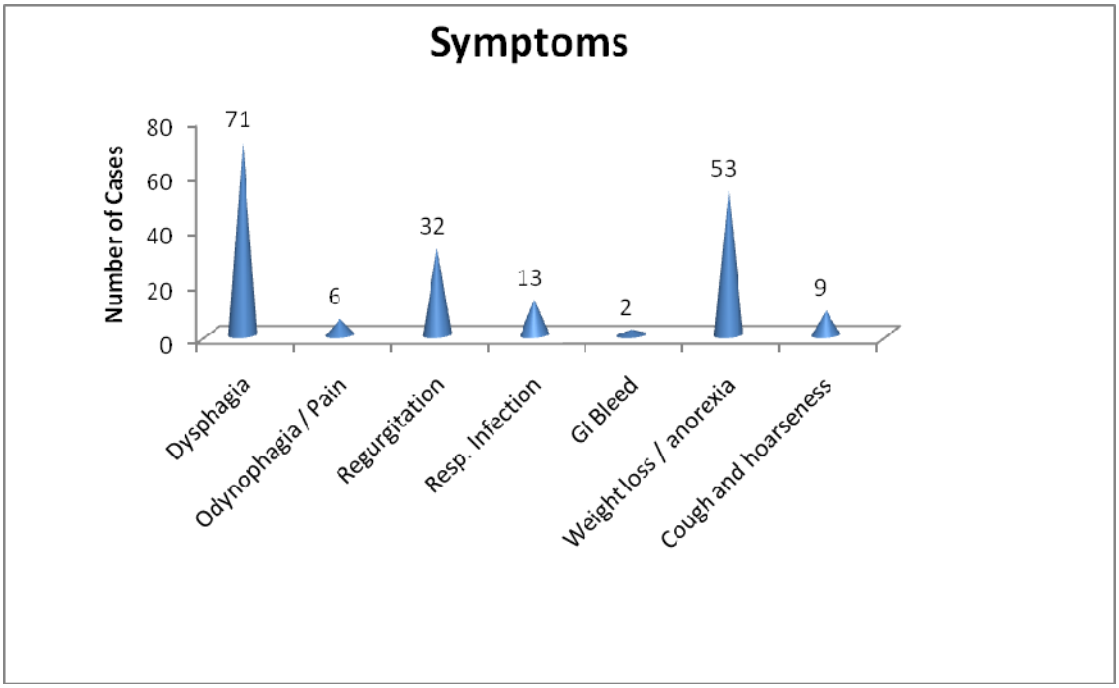
Maximum incidence was in the **6th** followed by **5th** decades.



In the study it was found the maximum incidence in **5th** decade **for male** and **6th** decade for **female.**

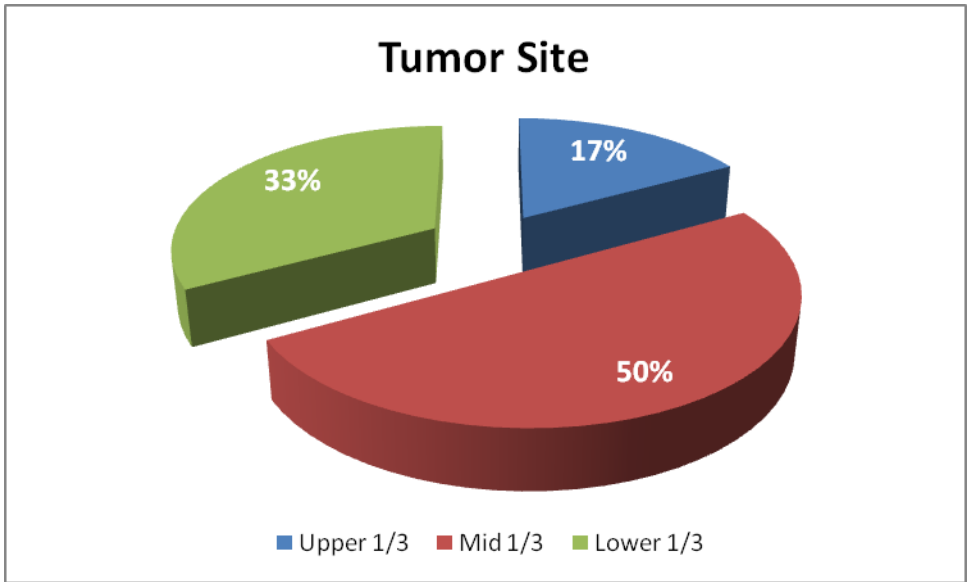


Dysphagia was the most common presenting symptom seen in 94% of the patients. Weight loss and anorexia were also common symptoms present in 70% of the patients other symptoms seen were regurgitation of food in 42%, recurrent respiratory infections and pneumonia in 18% of the patients. Cough and hoarseness of voice was seen in 12% of patients, odynophagia in 8% and gastrointestinal bleed was a rare feature seen in2 % of patients.



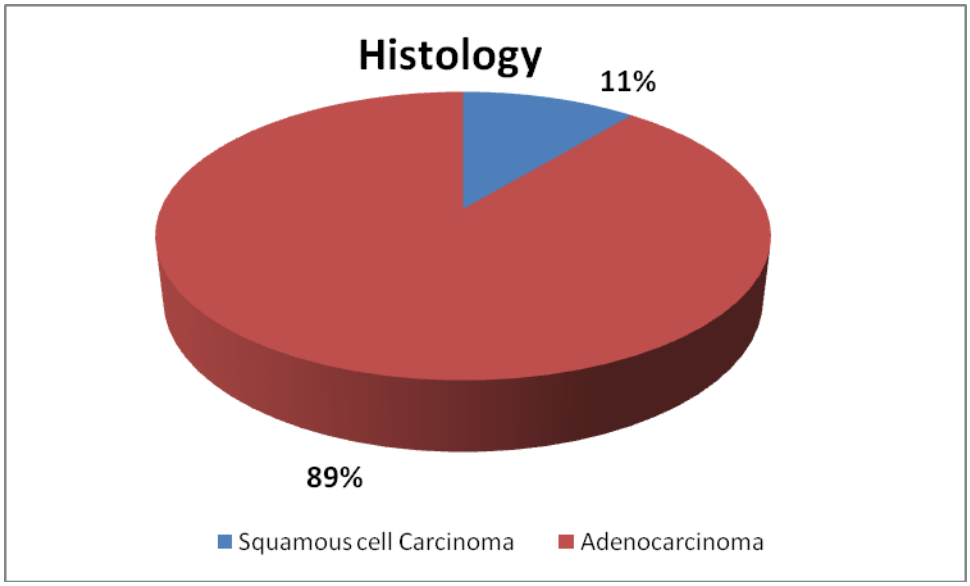
Dysphagia	71	94%
Odynophagia / Pain	6	08%
Regurgitation	32	42%
Resp. Infection	13	18%
GI Bleed	2	2%
Weight loss / anorexia	53	70%
Cough and hoarseness	9	12%

Though incidence of distal esophageal tumours is increasing worldwide, mid third tumours were more common in this study making up to 50% of the cases. Lower third tumour were next common making up 33% and upper third tumors were least common making up 17% of the total cases.



Upper 1/3	12	17%
Mid 1/3	38	50%
Lower 1/3	26	33%

Among the histological types, adenocarcinoma and squamous cell Carcinoma were the only 2 types encountered. Despite the increasing incidence of adenocarcinoma in the western countries, Squamous cell histology remained the predominant type seen in 67(89%) of the patients. Adenocarcinoma was seen in only 9 (11%) of the patients.



Resectability rate was very poor in our study. Only 8 patients could be taken up for Transhiatal esophagectomy and 2 for Ivor Lewis thoracoabdominal resections. Majority of the patients (66) had unresectable disease.

Of those with unresectable disease 38 were given palliative external beam Radiotherapy withor without Feeding Gastrostomy / Jejunostomy based on their level of Dysphagia. 28 patients who had either metastatic disease or poor performance status were offered supportive care with pain relief and enteral nutrition through' a feeding gastrostomy / Jejunostomy / Endo luminal stenting procedures where appropriate..

Treatment offered

A. Surgical resection 10
    1. Transhiatal esophagectomy 8
    2. Ivor Lewis esophagectomy 2
B. External RT / CT 38
C. Supportive Care 28

(FG / FJ / RT Feeding / Pain relief / Endoluminal Procedures)

Post op complications

On following up the operated patients, complications were encountered, which included a mortality rate of 10% which was due to anastamotic leak (in a patient post Ivor-lewis oesophagectomy). Pulmonary complications were encountered in 40% patients. Hemorrhage was encountered in 30% patients. Reflux was noted in 20% patients and could be managed conservatively.

Complication

Mortality	1 (10%)
Pulmonary complications	4 (40%)
Haemorrhage	3 (3%)
Reflux	2 (20%)

DISCUSSION

In this study, on analysis of the cases of carcinoma esophagus admitted at GRH it was seen that the disease is more prevalent among the males. (M:F-3.5:1) which is similar to the incidence in western countries. (In the U.S. M.F. – 4:1) (Ref 1).

The peak age of incidence was the sixth decade followed next by the 5^{th} decade which is similar to the incidence world wide (Ref 2)

On analyzing the symptoms at presentation it was seen that Dysphagia was the most common presenting symptom (94%) along with weight loss and anorexia (70%). This correlates cell with international statistics (Ref 3)

Symptoms of Ca esophagus and cardia (Ref-3)

Dysphagia	85.4%
Weight loss	60.9%
Pain	26.5%
Regurgitation	22.8%
Hoarseness	4.4%
Cough	2.5%
	(N = 907)

The commonest site of incidence was the mid third 50% of the esophagus in this study followed by lower third (which includes OG junction growth) 33% upper third tumours were least common 17%. This differs from western literature where the reported commonest site of incidence is the lower third making up 55% of the total tumors, followed only by mid third which make up 37%. Upper third tumours were rare (9%) (Ref 4,5,6).

Adenocarcinomas of the esophagus and cardia are relatively common in the Western hemisphere. The reported incidence of these cancers is increasing in the United States at a rate surpassing that of any other cancer. However Squamous cell carcinomas are the most common histological type of carcinoma esophagus worldwide (Ref. 7,8,9,10). In this study, Squamous cell carcinoma was the predominant histology forming 89% of the tumors. The remaining 11% weree Adenocarcinomas.

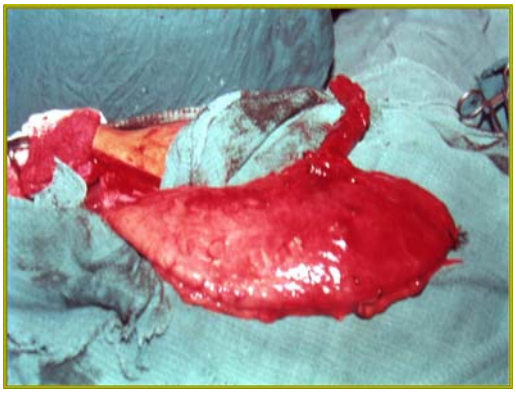
Presentation with carcinoma oesophagus was late in this study, majority presenting with either locally advanced or metastatic disease (80%). This correlates well but is higher than in western studies where the presentation with advanced disease varied from 60 – 75%(Ref. 9,10,11,12).

CONCLUSION

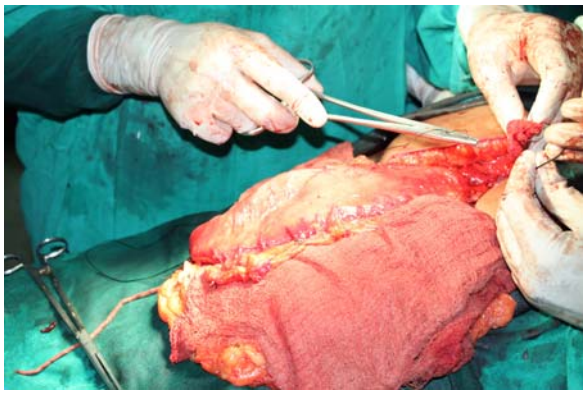
1. Incidence of Carcinoma esophagus is more common in **males**
2. Maximum incidence is in the **6th** decade followed by the **5th** decade.
3. **Dysphagia** and **weight loss** are the most common but late presenting features
4. Most common site of presentation is in the **middle third** in our population
5. **Squamous cell Carcinoma** still remains the predominant histological variety in our population.
6. **Carcinoma esophagus** has an aggressive behaviours and usually presents in late stages with a low rate of respectability.
7. Even with incurable disease, resection can offer superior palliation with restoration of swallowing.
8. Transhiatal resection offers comparable results to transthoracic resection with lower operative risk.

TRANSHIATAL ESOPHAGECTOMY

AFTER STOMACH MOBILISATION & ESOPHAGEAL RESECTION



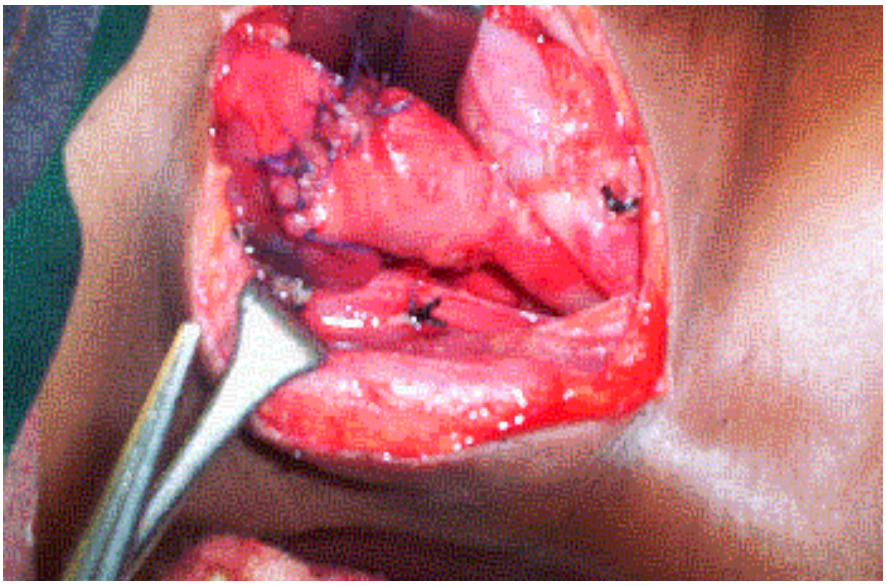
GASTRIC TUBE FASHIONING



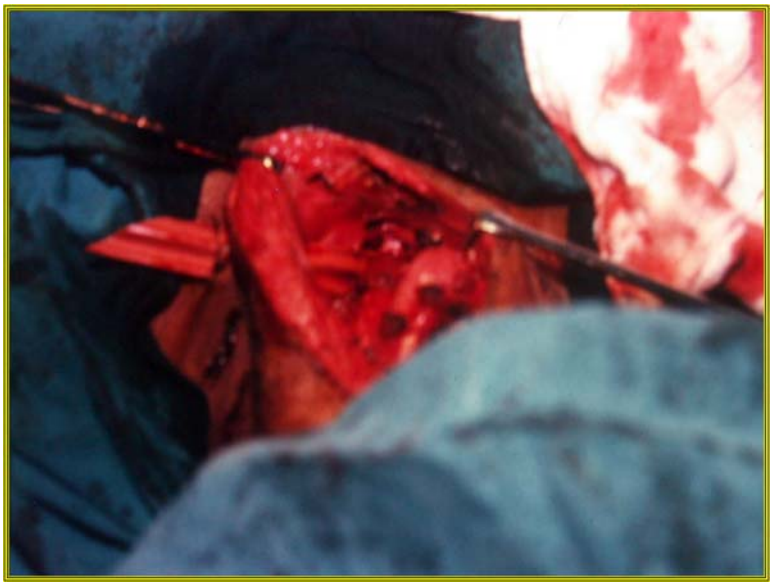
GASTRIC TUBE

TRANSHIATAL ESOPHAGECTOMY

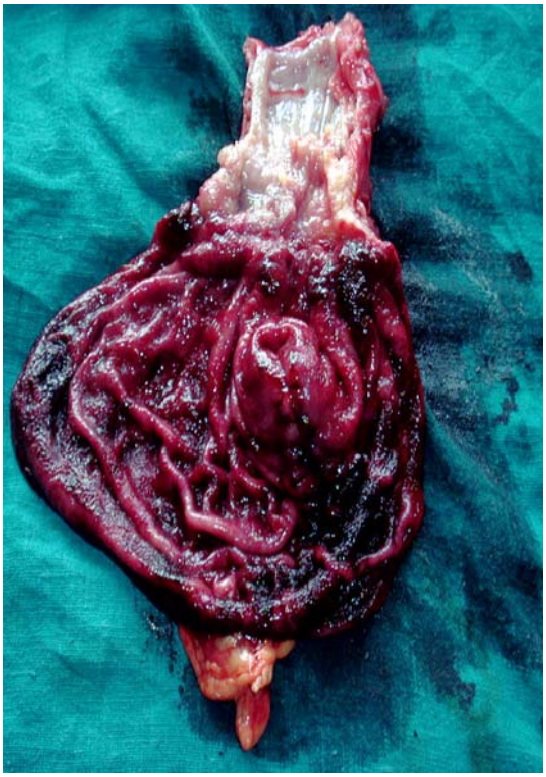
CERVICAL ESOPHAGO – GASTIC ANASTOMOSIS



CERVICAL WOUND

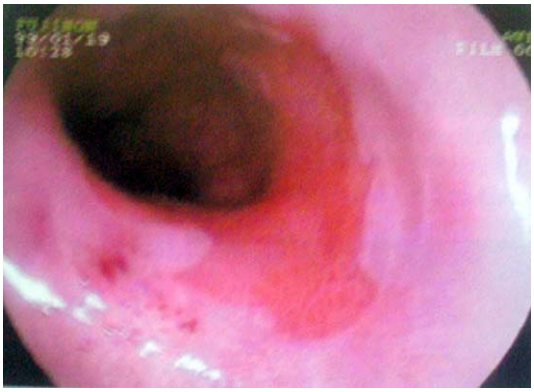


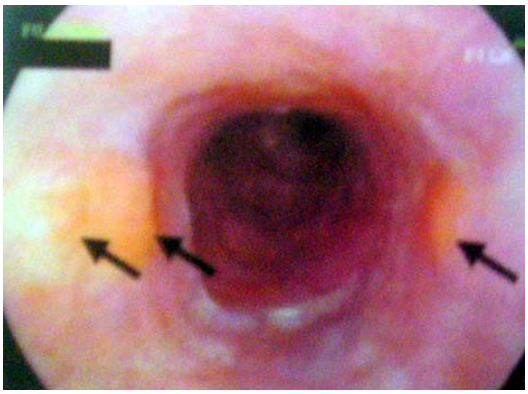
POST OF SPECIMENS



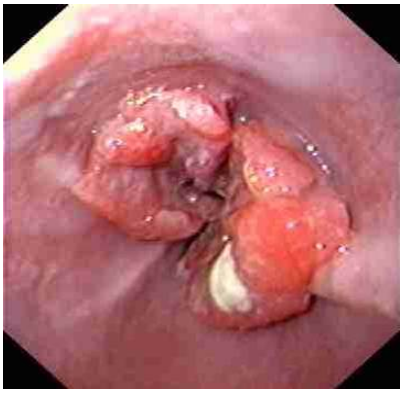
ENDOSCOPIC VEIW OF BARRETS LESIONS

ENDOSCOPIC VEIW OF EARLY CARCINOMA





ENDOSCOPIC VEIW OF ADVANCED CARCINOMA



PROFORMA

NAME :	IP NO :
AGE :	UNIT :
SEX :	WARD :

HISTORY

Dysphagia

odynophagia

Regurgitation

Respiratory infections

GI bleed

Weight loss ./ anorexia

Cough and hoarseness

other symptoms

CLINCIAL EXAMINATION

Jaundice

Hepatomegaly

Ascites

Axillary / Cervical nodes

Others

INVESTIGATIONS

UGI Scopy

Biopsy HPE

Ul;trasound abdomen

CT Chest & Abdomen

Barium swallow

Chest x – ray

Other

DIAGNOSIS

STAGE

SITE

TREATMENT

Surgery :

- Resectional Surgery
- Palliative surgery

Radiotherapy

Chemotherapy

Supprotive Care

POST OP GOLLOW – UP

Complication

Management

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